

What's in it for Us? The Benefits of Software Protection in Thailand

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Thai-U.S. tensions concerning international property rights (IPRs)¹ have escalated in the 1990s, the result of a declining U.S. trade balance, and the growing importance of the information sector to the U.S. economy.

An initial investigation under the U.S.'s Section 301 law was launched in 1989, and resulted in Thailand being placed on the Priority Foreign Country (PFC) list in 1991, which meant that it could face immediate trade sanctions.

In 1992, a decision was made to keep Thailand on the PFC list for a further year. A similar decision was made by the present U.S. Trade Representative, Mickey Kantor, on April 24, 1993.

The sustained pressure to reform IPRs led Thai legislators to draft an amended copyright act that explicitly included computer programs in its definition of "literary works" protected by copyright law.

The draft act was approved by the Cabinet on July 20, 1993, but has yet to pass through Parliament and the Senate. Several potential loopholes in the draft worry software owners and distributors. These include exceptions to copyright infringement for personal use, use by or for the government, and "reverse engineering" or decompilation of computer programs.

On July 28, Kantor informed Thailand that it would remain on the PFC list for at least another 30 days, despite progress on the IPR front. The U.S. wanted a written agreement on several further steps by the Thai government before Thailand could be removed from the PFC list.

For software, this meant inclusions into the draft copyright amendment that would restrict the practice of decompilation of computer programs. Thailand has accepted the request for a written agreement, including the provision for restricting decompilation.

Throughout much of the year, media coverage of Thai-U.S. dialogue has centered on the ongoing dispute between the two countries over protection of IPRs. None of the discussion, however, has comprehensively addressed the issue of what advantages, besides the absence of trade retaliation, will befall Thailand with enhanced IPR protection. This article considers one area of contention, i.e., copyright protection for computer software, and seeks to determine the benefits of increased protection for Thai industry.

Why protect intellectual property in a developing country? Those in favour of protection argue that it provides necessary incentives for domestic research and development (R&D), leads to the disclosure of new knowledge, allows for global technological dynamism, leads to increased technology transfers, and brings in more direct foreign investment.

Other benefits include additional human capital formation through better training practices and an environment conducive to R&D, pro-competitive effects such as "patenting around" existing technology, and consumer benefits through greater variety and quality of products.²

Let us consider these benefits in detail, and attempt to discern whether they would be realized with the enhanced protection of computer software in Thailand.

DOMESTIC RESEARCH AND DEVELOPMENT

The general question addressed in economic literature is whether or not protection of intellectual property stimulates inventive activity and, if so, to what degree. This article asks a much narrower question, i.e., will the protection of computer software by copyright law be an incentive to domestic R&D and, if so, to what degree. To answer this question, one must first think about the kind of software for which copyright protection is relevant.

A distinction should be drawn between the package software market and the customized software market. The customized software market involves software "solutions" developed for a particular public or private sector entity, typically for mid-range or mainframe computers. A solution may consist of software developed in-house, i.e., by the entity itself, software developed by an outside consultant, or imported components of the overall system (for example, database management systems). There are several reasons why piracy is not a significant problem in this market. First, complete software solutions are not mass-produced, packaged and distributed. Hence they are not easy to access and copy. Second, even if copied, the software often cannot be used without training. Third, periodic after-sales support and maintenance is needed to keep the systems running and up-to-date. Software obtained illegally would be more difficult to maintain. Fourth, software for this market is specialized and is a disincentive to piracy because it is not easy to sell. Finally, and most importantly, customized software is adequately protected by contract law.

The designers of software systems for clients, such as banks, retail stores, and government agencies, agree to specific terms regarding the use, sub-licensing (by the client) or marketing (by the designer) of the software. Unauthorized copying for any of the above reasons by the client, designer or third parties implies a violation of contractual law.

The conclusion, then, is that copyright protection is significant for "package" software, especially PC-based software. Operating systems, word-processing programs, and spreadsheet programs for PCs are incorporated in a few disks and are therefore accessible, easy to copy and, requiring little training, are easily sold. Clearly, lack of protection and enforcement thereof is a disincentive to innovate in this area. If there is no legal protection for the programs one writes, or if this protection is not backed up by effective enforcement, developing PC-based software will lead to giving away free software. This is precisely what occurred with early Thai-developed programs such as Rajavithi Word—a DOS-based, Thai word-processing program. Originally intended to be marketed commercially, lack of IPR protection and widespread piracy led to Rajavithi Word becoming virtually public domain software.

At present, locally-developed packages are mainly accounting and financial software packages produced by small, local firms. To prevent piracy, they must devise expensive hard locks and/or time-consuming "soft locks" (instructions within the larger program that are designed to detect and prevent unauthorized copying). Enforced legal protection of software, they assert, would allow them to lower prices on their products and use their time more productively. It would also give them the confidence to undertake more difficult, but also potentially more lucrative, projects. This suggests that weak IPR protection hinders the growth of locally-developed package software.

It is true that in the PC/package software market Thai firms produce barely a dozen, low-end products, while foreign packages localized and distributed in Thailand number in the hundreds and are much more sophisticated. Yet to conclude from this observation that the beneficial effects of increased IPR protection on domestic R&D are not significant misses the point. Greater protection could lead to more local products.

As an industry develops technologically, IPRs can only increase in importance.

DISCLOSURE OF NEW KNOWLEDGE

This argument refers mainly to patents, which require full disclosure of the nature and design of a purported invention. Nevertheless, it is important to demonstrate that enhanced copyright protection of computer software leads to very few benefits, if any, in the form of disclosure of new knowledge. As the regime for protection of software is copyright, there is no mandatory disclosure of source programs,³ which are the "blueprints" of computer programs. Furthermore, decompilation of programs to reveal their source codes is a practice dominant software producers consider to be infringement of copyright, and they campaign vigorously to have this declared illegal. As noted, the proposed written agreement between the U.S. and Thailand includes a provision to restrict the practice of decompilation. (Disclosure of knowledge in the form of technology transfers is dealt with in a separate section below.)

GLOBAL TECHNOLOGICAL DYNAMISM

Here the theory is that "the reform of intellectual property rights in developing countries could have an impact on global technology trends."⁴ Two main lines of argument are used to support this theory. The first is that domestic R&D fostered by IPR reform would lead to innovations that would otherwise be unavailable. When made with respect to the software industry, this is an extremely weak argument. Although it is acknowledged that weak IPRs do adversely affect the growth of a local package software industry, this does not imply that innovations in the package software market that can be used locally will be unavailable or slow to enter the market. This is because foreign-made software is, and continually will be, adapted or localized for Thailand. Package software derives its name precisely from the fact that it can be easily learned, used, and also modified for local conditions (primarily language modifications).

The second line of argument claims that industrialized countries' R&D in areas of special interest to less-developed regions may be curtailed by weak IPRs. A classic example is developed countries' research into tropical diseases. With software, however, it is apparent once again that the special needs of a developing country, or any country for that matter, involve the customized software industry. Contractual law, and not copyright or any other IPR regime, is an appropriate and adequate mechanism of protection for this kind of software. In the package software sector, special needs would refer mainly to incorporating Thai-language capabilities into all kinds of packages. Industrialized countries' R&D in this area is limited, regardless of the degree of IPR protection.

TECHNOLOGY TRANSFER

This argument maintains that without adequate protection of IPRs in developing countries, technology owners in developed countries have fewer incentives to transfer their proprietary knowledge to developing countries. Again, the argument seems to have been formed with patentable technology in mind. For example, it makes sense to argue that with patent protection for pharmaceuticals and the processes used to produce them, patent owners will be more willing to enter into production and technology-licensing agreements with a host country.⁵ Economic benefits accrue to the host in the forms of increased efficiency in the manufacturing process (through use of the new technology) and possible savings from not having to import the product (or substitutes if the owner previously refused to export its product without patent protection). Copyright protection of software is biased against the transfer of proprietary knowledge—for example, it precludes decompilation of source codes.

For the software industry, it is argued that technology transfers (through training and technical support) that accompany subcontracting arrangements require strong IPRs in developing countries. This is why countries like India will be favored over Thailand for subcontracting. Subcontracting of software projects, however, depends more on the availability of labor with the requisite educational (including English-language skills, which are essential for developing PC-based software for the global market) and technical skills. These factors, rather than IPRs, have a greater influence on the location of subcontracting projects.

Legally enacted (and enforced) protection of software will not result in a flood of new subcontracting deals for Thailand if the quantity and skill levels of Thai software professionals remain unchanged. Of course, all other things being equal, a strong IPR protection system in place would make a developing country more attractive than one without.

An objection to this argument might be that it fails to consider the effects of enacted and enforced protection of software on indigenous capacities. The premise is that there is a causal relationship between increased software protection and the growth (in quantity and quality) of labor for the software industry. Protection of software would allow local and foreign firms to undertake new projects and offer better compensation careers to programmers and analysts. This would encourage more students to enter the field, and would attract better talent.

This objection is valid only up to a point. There is an infrastructure constraint posed by the limited capacity and facilities of secondary and university educational institutions in Thailand. Protection of software cannot influence the development of indigenous capacities in a major way because of these limitations. Software protection must therefore be accompanied by measures to increase indigenous capacity if technology transfer gains are to be realized.

It should be noted that subcontracting of software projects does take place in Thailand. In the customized software industry, this may be for international or regional projects. Lack of copyright protection for software does not seem to be a constraint, probably because contractual arrangements between employees and firms are adequate. In the package software industry, arrangements are mainly to localize software packages for use in Thailand. As many PC package software producing companies refuse to market their products in Thailand, one valid argument is that with effective protection, these companies would have incentives to enter the Thai market, which would imply having to hire local software professionals for the localization/adaptation of their products. This in turn would expose Thai software professionals to a broader range of PC-based products, and would help to increase their knowledge and skill in PC-software development, which is becoming more important relative to proprietary mainframe software.

Other benefits that usually accompany technology transfers include access to new research methods and software development tools. In the software industry, these benefits are available regardless of the degree of protection for software, and even without subcontracting arrangements. In both the custom and package markets, the latest research methods are disseminated through academic and industry literature, as well as transcontinental electronic linkages. In the custom market, software developers must perforce train their recruits using the latest software engineering methods and tools to compete with other developers. Software development tools for the PC market are relatively easily obtained from the major software producers because of their desire to establish standards. Microsoft would be eager to sell anyone their application software development kits to create MS-DOS/Windows-compatible software.

CAPITAL FORMATION

This is one of the weakest arguments in favor of IPR protection. Empirical studies focusing on direct foreign investment (DFI) and its relation to IPR systems have produced weak associations at best, highlighting instead how broader economic and business conditions influence investment decisions.⁶ Thailand is a particularly good illustration of this fact.

A refinement of this thesis states that, although IPR systems may not affect levels of foreign investment, they do affect the composition thereof. Foreign firms will not choose to locate the more technology-intensive production stages in countries with weak IPRs for fear of losing proprietary knowledge. This is essentially a "technology transfer benefits" argument, and has been addressed in the section above.

OTHER BENEFITS

Increased protection of software will contribute to creating an environment conducive to R&D, which will

provide incentives to additional human capital formation. As noted, though, enhanced protection in itself is neither a sufficient nor necessary condition for the formation of human capital. Public and private sector investments are the driving forces in this area. Strong IPR regimes assume critical importance only at a relatively advanced stage of development, which Thailand has arguably not yet attained. Protection also provides consumers with a greater variety of better quality products.

In summary, although many of the theoretical benefits of stronger IPR protection are not relevant to Thailand's software industry, there are nevertheless some distinct advantages that could be gained through effective protection. These include:

- R&D and investment incentives for local PC/package software developers
- technology transfers (through training and technical support involved in localization of software) accompanying the entry of PC/package software producers (specifically, those who currently do not market their products in Thailand because of piracy)
- technology transfers and industry growth through increased international subcontracting for PC-software (subject to human capital development)
- industry growth through the attraction of more and better qualified labor
- consumer benefits in the form of greater variety and better quality of products

Critics of software protection might object that most of these benefits, purported to flow into developing countries from countries with stronger IPR protection, have not been empirically verified. This is true. Of the relatively few studies that have been conducted, most involve industrialized countries. Those conducted with reference to developing countries have reached ambiguous conclusions on issues such as the positive effects on domestic R&D and technology transfers.⁷ There are, however, two responses to this objection. First, given that IPR issues in developing countries have only recently come to the forefront of national attention, empirical evidence is bound to be lacking. Yet decisions concerning these issues are being made. Thus opinions on the effects of these decisions must be made on the basis of available information and analysis of industry structure. Second, while the benefits of increased IPR protection of software in particular are difficult to assess, the costs are no easier to establish. Administration and enforcement costs, increased royalty payments, displacement of pirates and anti-competitive effects (higher prices, reduced knowledge diffusion, dominance of foreign firms) have all been put forth as costs of increased protection, but it is unclear, at least for the first three, whether these costs are major constraints. Arguments pertaining to the anti-competitive effects of software protection merit further comment.

Higher prices refer to two effects. First, prices of legal software will always be higher than those of pirated software (which is free, or almost free). Thus, effective protection of software will reduce knowledge diffusion as less software will be sold. Second, to the extent that local firms are very small players in the package software market, increased protection (which is relevant only in this market) will benefit mainly foreign software. The market power of foreign firms will increase, allowing them to raise prices and reduce output. This will again reduce knowledge diffusion. Alternatively, foreign firms may sacrifice profit-maximizing goals to gain market share, keeping prices low. This, however, could result in significant barriers to entry by local firms in the package software market, hampering the growth of a domestic software industry.

The first argument makes sense, but the magnitude of reduced knowledge diffusion is unclear. Approximately 70-75 percent of all PCs in Thailand are used by organizations in the public, private and non-profit sectors. The remainder consists of PCs owned by private users.⁸ Among the organizations, package software purchased will be that required by the organization (the vast majority of which consists of word-processing, spreadsheet, database, and accounting/financial packages). Legalizing software will impose a cost on these firms and reduce their profit margins, but it is something most must do. Large organizations (for example, banks, financial firms, large retail chains) cannot, at this stage, opt not to use computers. Smaller firms, however, do experience a disincentive to computerize, and this reduces the rate of knowledge diffusion. For example, a small retail businesses using a local area network (LAN) of PCs could require operating systems software costing 150,000 baht, database software at 50-60,000 baht per

workstation, and applications software costing 10,000 baht per station.⁹ The total cost would be a substantial fraction of its turnover.

It is also argued that, for large firms, having to pay for software, while not permitting them to "de-computerize" creates incentives to reduce the amount of software used (i.e., by installing fewer PCs), thus reducing the rate of knowledge diffusion. Large organizations requiring PC-software, however, usually purchase network or multi-user versions of packages, which are more expensive than single-user versions, but which may be installed on and used by several PCs. Though converting to networks can also reduce the overall costs of legalizing software, this limits the organization's ability to cut costs by using fewer PCs. Thirty percent of individual PC users, including households, is clearly more sensitive to price changes. They are, however, also least constrained even by the very high degree of software protection, i.e., in the absence of door-to-door searches. They can obtain and use illegal software with impunity, unlike corporate or public sector users. In the recent Business Software Alliance's oft-quoted and hotly-disputed survey, the estimate of PC software piracy for the U.S. itself was 35 percent (99 percent for Thailand).¹⁰ As commercial piracy in the U.S. is low, most of this can be attributed to individual PC users. Thus, for this group as well, the seriousness of reduced knowledge diffusion because of higher prices is questionable.

In summary, the costs of reduced knowledge diffusion will be borne mainly by smaller firms in the private sector.¹¹ How significant these costs can be depends on how sensitive smaller firms are to the costs of legalizing their software. If deemed significant, government policy can help to reduce the effects on smaller companies by eliminating tariffs on direct import of certain types and amounts of packaged software. Other instruments, such as tax incentives for equipment, may also be targeted for this sector.

Finally, there remains the issue of dominance of the local PC/package software market by foreign firms and their products. It is reasoned that stronger protection for software will enable foreign products to establish dominant positions in the domestic market and raise barriers to entry. There are several objections to this argument. First, the alternative of weak protection adversely affects the R&D and investment incentives of local PC-software developing firms and, as a few U.S. firms already control the market in Thailand and elsewhere, this alternative will merely maintain the status quo. Second, in the PC-software industry, financial, marketing and distribution muscle are the main barriers to entry. This is why a few firms are dominant now and will continue to be dominant for quite some time. Thai firms can get a foothold in the market by developing Thai applications which support standard platforms, for example, DOS, Windows, or OS/2. This goes beyond localization of foreign products, and is aided by strong protection of software. Third, countries that have measures (high tariffs, similarity tests) to shield domestic software developers from foreign competition have arguably done more harm than good. Software, especially PC-software, continuously improves upon itself. Intense competition to establish standards creates this rapid pace of innovation, and any attempt to shield industry from the competitive arena will result in domestic products being quickly outdated, or being obsolete before they even reach the market.

CONCLUSIONS

This article argues that there are both costs and benefits of effective copyright protection for computer software and that, on balance, realizable gains outweigh potential costs, which can be mitigated by appropriate policy. There is an important point to be made, however, regarding the incidence of the two types of effects. The major cost is reduced knowledge diffusion experienced by smaller businesses. This effect will take place automatically if protection is effective and firms are compelled to legalize their software.

The benefits of protection, in contrast, are not automatic. Realizing long-term gains in increased domestic R&D and technology transfers in the software industry requires, in addition to strong IPR protection, implementation of measures that increase Thailand's capacity to innovate in this area. This implies a consistent and concerted effort to improve the educational and technological infrastructure, which will increase both the number and capabilities of professionals involved in software production. Software protection is a good idea, but protection alone is not enough.

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